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## Homework 2 - Project Charter

### **Project Approach**

All team members will work together to achieve the common goals. Each team member will be responsible for a specific set of tasks, however team members are expected to help on other tasks depending on the priority of tasks and the workload of any specific person. All team members are expected to put in equal amounts of effort, and having one's own duties complete does not excuse a member from contributing any further to the project.

### **Team Member Responsibilities**

The following definitions will serve as the guidelines for each team member's major tasks throughout the project lifetime. All team members are expected to help one another out to ensure the best outcomes for the project, not just for the individual's task completion.

#### ***Resource Manager***

The resource manager will keep track of the progress of the project by setting deadlines, scheduling tasks, and monitoring progress through tools such as Gantt charts. The resource manager is responsible for ensuring the end-to-end completion of the project, ensuring team collaboration, and communicating progress to management. The resource manager will be responsible for procuring any resources, namely required components and financial support.

#### ***Systems Engineer***

The systems engineer will have an understanding of the project as a whole and be responsible for the system's requirements. The systems engineer will define the project's objectives, monitor the hardware and software development to ensure the design objectives are being met, and generate alternatives case any solution fails or becomes unfeasible during development. The systems engineer will be responsible for testing the project to ensure quality and confirm that all specifications are met.

#### ***Hardware Development Engineer***

The hardware development engineer will be responsible for determining system hardware specifications to meet the requirements set by the systems engineer. The hardware engineer will develop PCBs, BOMs, perform construction of the boards, and understand the software interfacing that will occur, testing throughout construction to ensure a quality final product.

#### ***Software Development Engineer***

The software development engineer will be responsible for determining system software specifications to meet the requirements set by the systems engineer. The software engineer will develop code in any language necessary, using test-driven development, and understand the hardware interfacing that will occur. The software development engineer will perform domain,

software element, and requirements analysis to ensure the code produced matches the needs of the users.

### **Objectives**

The team is expected to create a quality final product that shows a true understanding of the engineering design process and highlights the individual technical prowess of each team member. The project will have measurable specifications for success, which will be set at achievable levels according to the team's capabilities and the time constraints for the course. The specifications will include system functionality and reliability to ensure a quality product. The final project will meet the design specifications set during planning, and will not be considered complete by the team until it does.

### **Resources Needed**

The team will require a dedicated collaborative space where regular meetings can occur, and items can remain posted between meetings. A lab area, equipped with computers that have OrCAD Cadence software and soldering stations will be required for the hardware design and construction. The software development can be done through any computer that has the proper tools installed, which depends upon the hardware chosen for the project. Financial resources required will be determined upon initial analysis of the project requirements.

### **Risk Management**

Throughout the project, certain risks will be accumulated, but through proper mitigation and action plans, the risk can be managed to allow project objectives to be completed on time. The major risks that will occur in the project will likely be related to increasing scope, insufficient resources, delayed shipments, and lack of motivation.

### **Mitigation Steps**

To avoid the possibility of increasing scope late in the project, there will be a change moratorium to the project's scope at the end of the senior thesis proposal class. Any additional substantial features must be put on hold until the end of the semester if time permits; all other requirements must be completed first. Proper resource management and thorough time and money planning will ensure that all resource expenditure is within budget. To avoid being affected by delayed shipments, parts will be ordered as soon as they are confirmed to be required. Thus, any shipment delays would delay the project, but they would not necessarily delay major milestones in the project development. To avoid slipping motivation, the team will be kept in close contact to create an atmosphere of team cooperation and ensure that all team members feel useful in the project. This knowledge of one's own usefulness will keep team members motivated throughout the long project.

### **Action Steps**

In the case of required increased project scope, the team will collaborate and decide the new priority of tasks using AHP. The tasks will be worked in the order decided, and the team will

understand which items may not be completed in time. In case of insufficient financial resources, the investors will be contacted, or more investors will be located to sponsor the project. If shipments are delayed, alternative distributors will be researched and ordered from to obtain the part in time. If there is a lack of motivation on the team, team outings will be planned that do not involve the project, but will allow team bonding and pending personal issues to be discussed.

### **Assessing Risks**

Different risks will be assessed using AHP, notably the pairwise comparisons, if there is not quantitative data available for the risks at hand. If possible, quantitative measurements, in terms of financial or class grade loss if the risk is realized, will allow comparison to determine which risks should be focused on to ensure that they are not realized.

### **Project Control**

The project will require documentation and processes to track progress, encourage timely completion of subtasks, and ensure timely completion of a quality final product. Gantt charts will be useful for tracking projects and setting realistic deadlines that the team can meet. Additionally, progress reports and weekly status meetings will ensure that all team members are aware of all progress and any impediments that there may be. This documentation will give visibility that will allow the team to assess risks and plan responses and actions in advance, instead of waiting until the last minute. Of course, all details from all members, no matter how small, will be documented in their engineering logbook, including a date and time. This detailed documentation is required for legal reasons and for guaranteeing that no project information is lost or forgotten.